

### REMARKS

The application has been carefully reviewed in light of the Office Action dated August 1, 2005. Claims 265 and 267 are in the application, both of which are independent. Claim 266 has been cancelled without prejudice. Claim 265 has been amended herein. Reconsideration and further examination are respectfully requested.

A Supplemental Application Data Sheet with the mailing address of inventor Vikki Spaulding is being submitted herewith, as required by the Office Action.

Claims 265 to 267 were rejected under 35 U.S.C. § 112, second paragraph. The rejection is respectfully traversed, and is submitted to have been obviated by the amendments made to Claim 265.

Claims 265 to 267 were rejected under 35 U.S.C. § 101 as not being supported by either a specific and substantial asserted utility or a well-established utility. In a related rejection, Claims 265 to 267 were rejected under 35 U.S.C. § 112, first paragraph, on the grounds that one skilled in the art would not know how to use the invention. These rejections are respectfully traversed.

The specification describes that the polynucleotides of the present invention can be used as markers for diagnosis. In particular, as discussed at page 173, lines 21 to 29 of the instant specification, the polynucleotides of the present invention can be used as markers for tissues in which the corresponding protein is preferentially expressed (either constitutively or at a particular stage of tissue differentiation or development or in disease states), and for selecting and making oligomers for attachment to a "gene chip". Applicants submit that one skilled in the art would easily understand how to use the bu45\_2 polynucleotide (SEQ ID NO: 35) as a marker for diagnosis.

It has been held that a post-filing reference can be used to prove that the disclosure was in fact enabling as filed. See *In re Brana*, 51 F.3d 1560, 1567, n.19, 34 U.S.P.Q.2d 1436, 1444 n.19 (Fed. Cir. 1995) (copy attached). A post-filing reference can be used to refute any doubts about an asserted utility. See *id.*

Here, Applicants submit that the asserted utility as a marker for disease diagnosis is substantiated by the document *Cancer Research*, vol. 63, February 2003, pp. 859-864, which is cited in the accompanying Information Disclosure Statement.

Specifically, the bu45\_2 polynucleotide is known as plasma glutamate carboxypeptidase (PGCP). See attached NCBI printout. As described in the *Cancer Research* document, PGCP can be used as a marker for hepatitis C virus-associated hepatocellular carcinoma. See paragraph bridging pp. 862 and 863, and Figs. 2 and 3.

In view of the foregoing, Applicants submit that the present invention is supported by a specific and substantial asserted utility and/or a well-established utility, and reconsideration and withdrawal of the § 101 and § 112, first paragraph, rejections are respectfully requested.

Claims 265 and 266 have been rejected under 35 U.S.C. § 102(a) over WO 97/39030 (WO '030), and Claim 265 has been rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,470,719 (Meng). These rejections are respectfully traversed.

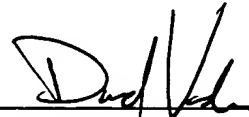
Neither WO '030 nor Meng is seen to disclose any of the polynucleotides recited in parts (a) to (d) of Claim 265.

Accordingly, reconsideration and withdrawal of the § 102 rejections are respectfully requested.

No other matters being raised, it is believed that the entire application is fully in condition for allowance, and such action is courteously solicited.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office by telephone at (714) 540-8700. All correspondence should be directed to our address given below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Damond E. Vadnais', is written over a horizontal line.

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Attorney for Applicants  
Registration No. 52,310

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CA\_MAIN 108422v1

NCBI Nucleotide

Search  for

Limits Preview/Index History Clipboard Details

Display  Show  Send to

Range: from  to  ☐ Reverse complemented strand Features: ☐ SNP ☐ CDD ☒ MGC

☐ 1: [NM\\_016134](#). Reports Homo sapiens plas...[gi:21314657] [Links](#)

LOCUS NM\_016134 1928 bp mRNA linear PRI 17-OCT-2005

DEFINITION Homo sapiens plasma glutamate carboxypeptidase (PGCP), mRNA.

ACCESSION NM\_016134 NM\_006102

VERSION NM\_016134.2 GI:21314657

KEYWORDS

SOURCE Homo sapiens (human)

ORGANISM [Homo sapiens](#)  
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;  
Mammalia; Eutheria; Euarchontoglires; Primates; Catarrhini;  
Hominidae; Homo.

REFERENCE 1 (bases 1 to 1928)

AUTHORS Barinka,C., Mlcochova,P., Sacha,P., Hilgert,I., Majer,P.,  
Slusher,B.S., Horejci,V. and Konvalinka,J.

TITLE Amino acids at the N- and C-termini of human glutamate  
carboxypeptidase II are required for enzymatic activity and proper  
folding

JOURNAL Eur. J. Biochem. 271 (13), 2782-2790 (2004)

PUBMED 15206943

REMARK GeneRIF: amino acid segments at the N- and C-termini of the  
ectodomain of GCPII are essential for its carboxypeptidase activity  
and/or proper folding

REFERENCE 2 (bases 1 to 1928)

AUTHORS Gingras,R., Richard,C., El-Alfy,M., Morales,C.R., Potier,M. and  
Pshzhetsky,A.V.

TITLE Purification, cDNA cloning, and expression of a new human blood  
plasma glutamate carboxypeptidase homologous to  
N-acetyl-aspartyl-alpha-glutamate  
carboxypeptidase/prostate-specific membrane antigen

JOURNAL J. Biol. Chem. 274 (17), 11742-11750 (1999)

PUBMED 10206990

COMMENT PROVISIONAL REFSEQ: This record has not yet been subject to final  
NCBI review. The reference sequence was derived from [BC020689.1](#).  
On or before Nov 4, 2002 this sequence version replaced [gi:5174626](#),  
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FEATURES

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Dec 8 2005 13:13:13

LEXSEE 51 F.3D 1560

IN RE MIGUEL F. BRANA, JOSE M. C. BERLANGA, MARINA M. MOSET, ERICH  
SCHLICK and GERHARD KEILHAUER

93-1393

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

*51 F.3d 1560; 1995 U.S. App. LEXIS 6362; 34 U.S.P.Q.2D (BNA) 1436*

March 30, 1995, Decided

**SUBSEQUENT HISTORY: [\*\*1]**

As Amended March 30, 1995.

**PRIOR HISTORY:** Appealed from: U.S. Patent and Trademark Office Board of Patent Appeals and Interferences. (Serial No. 07/533,944).

**DISPOSITION:** REVERSED**CASE SUMMARY:**

**PROCEDURAL POSTURE:** Appellant applicants sought review of a United States Patent and Trademark Office Board of Patent Appeals and Interferences decision affirming a patent examiner's rejection of the applicants' claims based on a challenge to the utility of the claimed compounds and the amount of experimentation necessary to use the compounds.

**OVERVIEW:** The applicants filed specifications stating that the application's non-symmetrical substitutions produced compounds with better action and better action spectrum as anti-tumor substances than known drug research. The application was rejected because the specification failed to describe any specific disease against which the compounds were active and the prior art and other tests disclosed in the specification were insufficient to establish expectation that the claimed compounds had a practical utility. The court reversed, holding that the tumor models represented a specific disease against which the claimed compounds were alleged to be effective, and the applicants' specification alleged a sufficiently specific use. In addition, the court held that taking the nature of the invention, one skilled in the art would be without basis to reasonably doubt the applicants' asserted utility on its face. Even if one so skilled would have reasonably questioned the asserted utility, the applicants proffered sufficient evidence to convince one so skilled of the asserted utility.

**OUTCOME:** The rejection of the applicants' claims was reversed.

**LexisNexis(R) Headnotes**

*Patent Law > Subject Matter > Products > Compositions of Matter*

*Patent Law > U.S. Patent & Trademark Office Proceedings > Continuation Applications > General Overview*

*Patent Law > Utility Requirement > Proof of Utility*

[HN1] The requirement that an invention have utility is found in 35 U.S.C.S. § 101, which states that whoever invents any new and useful composition of matter may obtain a patent therefor.

*Patent Law > Claims & Specifications > Definiteness > General Overview*

*Patent Law > Claims & Specifications > Description Requirement > General Overview*

[HN2] The requirement that an invention have utility is implicit in 35 U.S.C.S. § 112 P1, which reads that the specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

*Patent Law > Claims & Specifications > Enablement Requirement > General Overview*

*Patent Law > Claims & Specifications > Description Requirement > General Overview*

*Patent Law > Claims & Specifications > Claim Language > General Overview*

[HN3] A specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought

to be patented must be taken as in compliance with the enabling requirement of the first paragraph of 35 U.S.C.S. § 112 unless there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support.

***Patent Law > Utility Requirement > Proof of Utility***

[HN4] The United States Patent and Trademark Office has the initial burden of challenging a presumptively correct assertion of utility in the disclosure.

***Patent Law > Utility Requirement > Proof of Utility***

***Patent Law > Inequitable Conduct > General Overview***

***Patent Law > Claims & Specifications > Enablement Requirement > General Overview***

[HN5] Only after the United States Patent and Trademark Office provides evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility does the burden shift to the applicant to provide rebuttal evidence sufficient to convince such a person of the invention's asserted utility.

***Patent Law > Utility Requirement > Proof of Utility***

[HN6] Although it is true that minor changes in chemical compounds can radically alter their effects on the human body, evidence of success in structurally similar compounds is relevant in determining whether one skilled in the art would believe an asserted utility.

***Patent Law > Utility Requirement > Proof of Utility***

[HN7] Proof of an alleged pharmaceutical property for a compound by statistically significant tests with standard experimental animals is sufficient to establish utility.

***Patent Law > Utility Requirement > Proof of Utility***

[HN8] Food and Drug Administration approval is not a prerequisite for finding a compound useful within the meaning of the patent laws.

***Patent Law > Remedies > Collateral Assessments > Costs***

***Patent Law > Utility Requirement > Chemical Compounds***

***Patent Law > Utility Requirement > Proof of Utility***

[HN9] Usefulness in patent law, and in particular in the context of pharmaceutical inventions, necessarily includes the expectation of further research and development. The stage at which an invention in this field becomes useful is well before it is ready to be administered to humans.

***Administrative Law > Judicial Review > Reviewability > Questions of Law***

***Administrative Law > Judicial Review > Reviewability > Factual Determinations***

***Patent Law > U.S. Patent & Trademark Office Proceedings > General Overview***

[HN10] An appellate court's standard of review is, with regard to questions of law, that review is without deference to the views of an agency, and with regard to questions of fact, an appellate court defers to an agency unless its findings are clearly erroneous.

***Administrative Law > Judicial Review > Reviewability > Questions of Law***

***Administrative Law > Judicial Review > Reviewability > Factual Determinations***

***Patent Law > Jurisdiction & Review > Standards of Review > General Overview***

[HN11] With regard to judgment calls, those questions that fall somewhere near the middle of the fact-law spectrum, an appellate court has recognized the falseness of the fact-law dichotomy, since the determination at issue, involving as it does the application of a general legal standard to particular facts, is probably most realistically described as neither of fact nor law, but mixed. When these questions of judgment are before an appellate court, whether it defers to agency judgment, and the extent to which it defers, turns on the nature of the case and the nature of the judgment.

**COUNSEL:** Malcolm J. MacDonald, Keil & MacDonald, of Washington, D.C., argued for appellant. With him on the brief was Herbert B. Keil. Of Counsel was David S. Nagy.

Fred E. McKelvey, Solicitor, Office of the Solicitor, of Arlington, Virginia, argued for appellee. With him on the brief were Albin F. Drost, Deputy Solicitor, Richard E. Schafer, Teddy S. Gron, Joseph G. Piccolo and Richard L. Torczon, Associate Solicitors.

**JUDGES:** Before PLAGER, LOURIE, and RADER, Circuit Judges.

**OPINIONBY:** PLAGER

**OPINION:** [\*1562] PLAGER, *Circuit Judge*.

Miguel F. Brana, *et al.* (applicants), appeal the March 19, 1993 decision of the United States Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (Board), in Appeal No. 92-1196. The Board affirmed the examiner's rejection of claims 10-13 of patent application Serial No. 533,944 under 35 U.S.C. § 112 P1 (1988). n1 The examiner's rejection, upon which the Board relied in rendering its decision, was based specifically on a challenge to the utility of the claimed compounds and the amount of experimentation necessary



to use the compounds. [\*\*2] We conclude the Board erred, and reverse.

n1 Unless otherwise noted, all United States Code citations are to the 1988 edition.

## I. BACKGROUND

On June 30, 1988, applicants filed patent application Serial No. 213,690 (the '690 application) n2 directed to 5-nitrobenzodeisoquinoline-1,3-dione compounds, for use as antitumor substances, having the following formula:

where n is 1 or 2, R1 and R2 are identical or different and are each hydrogen, C1-C6-alkyl, C1-C6-hydroxyalkyl, pyrrolidinyl, morpholino, piperidinyl or piperacetyl, and R3 and R4 are identical or different and are each hydrogen, C1-C6-alkyl, C1-C6-acyl, C2-C7-alkoxycarbonyl, ureyl, aminocarbonyl or C2-C7-alkylaminocarbonyl. These claimed compounds differ from several prior art benzodeisoquinoline-1,3-dione compounds due to the presence of a nitro group (O2N) at the 5-position and an amino or other amino group (NR3R4) at the 8-position of the isoquinoline ring.

n2 This is a divisional of patent application Serial No. 110,871 filed October 21, 1987.

[\*\*3]

The specification states that these non-symmetrical substitutions at the 5- and 8-positions produce compounds with "a better action and a better action spectrum as antitumor substances" than known benzodeisoquinolines, namely those in K.D. Paull et al., *Computer Assisted Structure-Activity Correlations, Drug Research*, 34(II), 1243-46 (1984) (Paull). Paull describes a computer-assisted evaluation of benzodeisoquinoline-1,3-diones and related compounds which have been screened for antitumor activity by testing their efficacy *in vivo* n3 against two specific implanted murine (i.e., utilizing mice as test subjects) lymphocytic leukemias, P388 and L1210. n4 These two *in vivo* tests are [\*1563] widely used by the National Cancer Institute (NCI) to measure the antitumor properties of a compound. Paull noted that one compound in particular, benzodeisoquinoline-1,3(2H)dione, 5-amino-2-(2-dimethyl-aminoethyl [sic]) (hereinafter "NSC 308847"), was found to show excellent activity against these two specific tumor models. Based on their analysis, compound NSC 308847 was selected for further studies by NCI. In addition to comparing the effectiveness of the claimed compounds [\*\*4] with structurally similar compounds in Paull, applicants' patent specification illustrates the cyto-

toxicity of the claimed compounds against human tumor cells, *in vitro*, n5 and concludes that these tests "had a good action." n6

n3 *In vivo* means "in the living body, referring to a process occurring therein." *Steadman's Medical Dictionary* 798 (25th ed. 1990). *In vitro* means "in an artificial environment, referring to a process or reaction occurring therein, as in a test tube or culture media." *Id.*

n4 The analysis in Paull consisted of grouping the previously-tested compounds into groups based on common structural features and cross-referencing the various groups, in light of the success rates of the group as a whole, to determine specific compounds that may be effective in treating tumors.

n5 *See supra* note 3.

n6 The specification does not state the specific type of human tumor cells used in this test.

The examiner initially rejected applicants' [\*\*5] claims in the '690 application as obvious under 35 U.S.C. § 103 in light of U.S. Patent No. 4,614,820, issued to and referred to hereafter as Zee-Cheng et al. Zee-Cheng et al. discloses a benzodeisoquinoline compound for use as an antitumor agent with symmetrical substitutions on the 5-position and 8-position of the quinoline ring; in both positions the substitution was either an amino or nitro group. n7 Although not identical to the applicants' claimed compounds, the examiner noted the similar substitution pattern (i.e., at the same positions on the isoquinoline ring) and concluded that a mixed substitution of the invention therefore would have been obvious in view of Zee-Cheng et al.

n7 The chemical compound in Zee-Cheng et al. is labeled a 3,6-disubstituted-1,8-naphthalimide and uses different numbering for the positions on the isoquinoline ring. The structure of this compound, however, is identical to that claimed by the applicants except for symmetrical substitutions at the 5-position and the 8-position of the isoquinoline ring. Zee-Cheng et al. teaches identical substitutions of amino or nitro groups while applicants claim a nitro group substitution at the 5-position and an amino group substitution at the 8-position.

[\*\*6]

In a response dated July 14, 1989, the applicants rebutted the § 103 rejection. Applicants asserted that their

mixed disubstituted compounds had unexpectedly better antitumor properties than the symmetrically substituted compounds in Zee-Cheng et al. In support of this assertion applicants attached the declaration of Dr. Gerhard Keilhauer. In his declaration Dr. Keilhauer reported that his tests indicated that applicants' claimed compounds were far more effective as antitumor agents than the compounds disclosed in Zee-Cheng et al. when tested, *in vitro*, against two specific types of human tumor cells, HEp and HCT-29. n8 Applicants further noted that, although the differences between the compounds in Zee-Cheng et al. and applicants' claimed compounds were slight, there was no suggestion in the art that these improved results (over Zee-Cheng et al.) would have been expected. Although the applicants overcame the § 103 rejection, the examiner nevertheless issued a final rejection, on different grounds, on September 5, 1989.

n8 HEp cells are derived from laryngeal cancer and HCT-29 cells from colon cancer.

[\*\*7]

On June 4, 1990, applicants filed a continuation application, Serial No. 533,944 (the '944 application), from the above-mentioned '690 application. Claims 10-13, the only claims remaining in the continuation application, were rejected in a final office action dated May 1, 1991. Applicants appealed the examiner's final rejection to the Board.

In his answer to the applicants' appeal brief, the examiner stated that the final rejection was based on 35 U.S.C. § 112 P1. n9 The examiner first noted that the specification failed to describe any specific disease against which the claimed compounds were active. Furthermore, the examiner concluded that the prior art tests performed in Paull and the tests disclosed in the specification were not sufficient to establish a reasonable expectation that the claimed compounds had [\*1564] a practical utility (i.e. antitumor activity in humans). n10

n9 The examiner's answer noted that the final rejection also could have been made under 35 U.S.C. § 101 for failure to disclose a practical utility.

n10 The examiner subsequently filed two supplemental answers in response to arguments raised by the applicants in supplemental reply briefs.

[\*\*8]

In a decision dated March 19, 1993, the Board affirmed the examiner's final rejection. The three-page opinion, which lacked any additional analysis, relied entirely on the examiner's reasoning. Although noting that it also

would have been proper for the examiner to reject the claims under 35 U.S.C. § 101, the Board affirmed solely on the basis of the Examiner's § 112 P1 rejection. This appeal followed.

## II. DISCUSSION

At issue in this case is an important question of the legal constraints on patent office examination practice and policy. The question is, with regard to pharmaceutical inventions, what must the applicant prove regarding the practical utility or usefulness of the invention for which patent protection is sought. This is not a new issue; it is one which we would have thought had been settled by case law years ago. n11 We note the Commissioner has recently addressed this question in his Examiner Guidelines for Biotech Applications, *see* 60 Fed. Reg. 97 (1995); 49 Pat. Trademark & Copyright J. (BNA) No. 1210, at 234 (Jan. 5, 1995).

n11 *See, e.g., Cross v. Iizuka*, 753 F.2d 1040, 224 U.S.P.Q. (BNA) 739 (Fed. Cir. 1985); *In re Langer*, 503 F.2d 1380, 183 U.S.P.Q. (BNA) 288 (CCPA 1974); *In re Krimmel*, 48 C.C.P.A. 1116, 292 F.2d 948, 130 U.S.P.Q. (BNA) 215 (CCPA 1961); *In re Bergel*, 48 C.C.P.A. 1101, 292 F.2d 958, 130 U.S.P.Q. (BNA) 205 (CCPA 1961).

[\*\*9]

[HN1] The requirement that an invention have utility is found in 35 U.S.C. § 101: "Whoever invents . . . any new and *useful* . . . composition of matter . . . may obtain a patent therefor . . ." (emphasis added). [HN2] It is also implicit in § 112 P1, which reads:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Obviously, if a claimed invention does not have utility, the specification cannot enable one to use it.

As noted, although the examiner and the Board both mentioned § 101, and the rejection appears to be based on the issue of whether the compounds had a practical utility, a § 101 issue, the rejection according to the Board stands on the requirements of § 112 P1. It is to that provision that we address ourselves. n12 The Board gives two reasons for the rejection; n13 we will consider these in turn.

n12 This court's predecessor has determined that absence of utility can be the basis of a rejection under both 35 U.S.C. § 101 and § 112 P1. *In re Jolles*, 628 F.2d 1322, 1326 n.11, 206 U.S.P.Q. (BNA) 885, 889 n.11 (CCPA 1980); *In re Fouche*, 58 C.C.P.A. 1086, 439 F.2d 1237, 1243, 169 U.S.P.Q. (BNA) 429, 434 (CCPA 1971) ("If such compositions are in fact useless, appellant's specification cannot have taught how to use them."). Since the Board affirmed the examiner's rejection based solely on § 112 P1, however, our review is limited only to whether the application complies with § 112 P1.

[\*\*10]

n13 The Board's decision did not expressly make any independent factual determinations or legal conclusions. Rather, the Board stated that it "agreed with the examiner's well reasoned, well stated and fully supported by citation of relevant precedent position in every particular, and any further comment which we might add would be redundant." *Ex parte Brana et al.*, No. 92-1196 (Bd. Pat. App. & Int. March 19, 1993) at 2-3. Therefore, reference in this opinion to Board findings are actually arguments made by the examiner which have been expressly adopted by the Board.

1.

The first basis for the Board's decision was that the applicants' specification failed to disclose a specific disease against which the claimed compounds are useful, and therefore, absent undue experimentation, one of ordinary skill in the art was precluded from using the invention. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 U.S.P.Q. (BNA) 81, 94 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947, 94 L. Ed. 2d 792, 107 S. Ct. 1606 (1987). In support, the Commissioner argues that the disclosed uses in [\*1565] the '944 application, [\*\*11] namely the "treatment of diseases" and "antitumor substances," are similar to the nebulous disclosure found insufficient in *In re Kirk*, 54 C.C.P.A. 1119, 376 F.2d 936, 153 U.S.P.Q. (BNA) 48 (CCPA 1967). This argument is not without merit.

In *Kirk* applicants claimed a new class of steroid compounds. One of the alleged utilities disclosed in the specification was that these compounds possessed "high biological activity." 376 F.2d at 938, 153 U.S.P.Q. (BNA) at 50. The specification, however, failed to disclose which biological properties made the compounds useful. Moreover, the court found that known specific uses of

similar compounds did not cure this defect since there was no disclosure in the specification that the properties of the claimed compounds were the same as those of the known similar compounds. *Id.* at 942, 153 U.S.P.Q. (BNA) at 53. Furthermore, it was not alleged that one of skill in the art would have known of any specific uses, and therefore, the court concluded this alleged use was too obscure to enable one of skill in the art to use the claimed invention. *See also Kawai v. Metlesics*, 480 F.2d 880, 178 U.S.P.Q. (BNA) 158 (CCPA 1973).

*Kirk* would potentially be dispositive [\*\*12] of this case were the above-mentioned language the only assertion of utility found in the '944 application. Applicants' specification, however, also states that the claimed compounds have "a better action and a better action spectrum as antitumor substances" than known compounds, specifically those analyzed in Paull. As previously noted, *see supra* note 4, Paull grouped various benzodeisoquinoline-1,3-diones, which had previously been tested *in vivo* for antitumor activity against two lymphocytic leukemia tumor models (P388 and L1210), into various structural classifications and analyzed the test results of the groups (i.e. what percent of the compounds in the particular group showed success against the tumor models). Since one of the tested compounds, NSC 308847, was found to be highly effective against these two lymphocytic leukemia tumor models, n14 applicants' favorable comparison implicitly asserts that their claimed compounds are highly effective (i.e. useful) against lymphocytic leukemia. An alleged use against this particular type of cancer is much more specific than the vaguely intimated uses rejected by the courts in *Kirk* and *Kawai*. [\*\*13] *See, e.g., Cross v. Iizuka*, 753 F.2d at 1048, 224 U.S.P.Q. (BNA) at 745 (finding the disclosed practical utility for the claimed compounds — the inhibition of thromboxane synthetase in human or bovine platelet microsomes — sufficiently specific to satisfy the threshold requirement in *Kirk* and *Kawai*.)

n14 Paull also found NSC 308847 to be effective against two other test models, B16 melanoma and Colon C872.

The Commissioner contends, however, that P388 and L1210 are not diseases since the only way an animal can get sick from P388 is by a direct injection of the cell line. The Commissioner therefore concludes that applicants' reference to Paull in their specification does not provide a specific disease against which the claimed compounds can be used. We disagree.

As applicants point out, the P388 and L1210 cell lines, though technically labeled tumor models, were originally

derived from lymphocytic leukemias in mice. Therefore, the P388 and L1210 cell lines do represent actual specific lymphocytic [\*14] tumors; these models will produce this particular disease once implanted in mice. If applicants were required to wait until an animal naturally developed this specific tumor before testing the effectiveness of a compound against the tumor *in vivo*, as would be implied from the Commissioner's argument, there would be no effective way to test compounds *in vivo* on a large scale.

We conclude that these tumor models represent a specific disease against which the claimed compounds are alleged to be effective. Accordingly, in light of the explicit reference to Paull, applicants' specification alleges a sufficiently specific use.

2.

The second basis for the Board's rejection was that, even if the specification did allege a specific use, applicants failed to [\*1566] prove that the claimed compounds are useful. Citing various references, n15 the Board found, and the Commissioner now argues, that the tests offered by the applicants to prove utility were inadequate to convince one of ordinary skill in the art that the claimed compounds are useful as antitumor agents. n16

n15 See Pazdur et al., *Correlation of Murine Antitumor Models in Predicting Clinical Drug Activity in Non-Small Cell Lung Cancer: A Six Year Experience*, 3 Proceedings Am. Soc. Clin. Oncology 219 (1984); Martin et al., *Role of Murine Tumor Models in Cancer Research*, 46 Cancer Research 2189 (April 1986).

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n16 As noted, this would appear to be a § 101 issue, rather than § 112.

This court's predecessor has stated:

[A] specification [HN3] disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented *must* be taken as in compliance with the enabling requirement of the first paragraph of § 112 *unless* there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support.

*In re Marzocchi*, 58 C.C.P.A. 1069, 439 F.2d 220, 223, 169 U.S.P.Q. (BNA) 367, 369 (CCPA 1971). From this it follows that [HN4] the PTO has the initial burden of challenging a presumptively correct assertion of utility in the disclosure. 439 F.2d at 224, 169 U.S.P.Q. (BNA) at 370. [HN5] Only after the PTO provides evidence showing that one of ordinary skill in the art would reasonably doubt the asserted utility does the burden shift to the applicant to provide rebuttal evidence sufficient to convince such a person of the invention's [\*16] asserted utility. See *In re Bundy*, 642 F.2d 430, 433, 209 U.S.P.Q. (BNA) 48, 51 (CCPA 1981). n17

n17 See also *In re Novak*, 49 C.C.P.A. 1283, 306 F.2d 924, 928, 134 U.S.P.Q. (BNA) 335, 337 (CCPA 1962) (stating that it is proper for the examiner to request evidence to substantiate an asserted utility unless one with ordinary skill in the art would accept the allegations as obviously valid and correct); *In re Chilowsky*, 43 C.C.P.A. 775, 229 F.2d 457, 462, 108 U.S.P.Q. (BNA) 321, 325 (CCPA 1956) ("Where the mode of operation alleged can be readily understood and conforms to the known laws of physics and chemistry . . . no further evidence is required."). But see *In re Marzocchi*, 439 F.2d at 223, 169 U.S.P.Q. (BNA) at 369-70 ("In the field of chemistry generally there may be times when the well-known unpredictability of chemical reactions will alone be enough to create a reasonable doubt as to the accuracy of a particular broad statement put forward as enabling support for a claim. This will especially be the case where the statement is, on its face, contrary to generally accepted scientific principles.").

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The PTO has not met this initial burden. The references cited by the Board, Pazdur and Martin, n18 do not question the usefulness of any compound as an antitumor agent or provide any other evidence to cause one of skill in the art to question the asserted utility of applicants' compounds. Rather, these references merely discuss the therapeutic predictive value of *in vivo* murine tests — relevant only if applicants must prove the ultimate value in humans of their asserted utility. Likewise, we do not find that the nature of applicants' invention alone would cause one of skill in the art to reasonably doubt the asserted usefulness.

n18 See *supra* note 15.

The purpose of treating cancer with chemical com-

pounds does not suggest an inherently unbelievable undertaking or involve implausible scientific principles. *In re Jolles*, 628 F.2d at 1327, 206 U.S.P.Q. (BNA) at 890. Modern science has previously identified numerous successful chemotherapeutic agents. In addition, the prior art, specifically [\*\*18] Zee Cheng et al., discloses structurally similar compounds to those claimed by the applicants which have been proven *in vivo* to be effective as chemotherapeutic agents against various tumor models.

Taking these facts — the nature of the invention and the PTO's proffered evidence — into consideration we conclude that one skilled in the art would be without basis to reasonably doubt applicants' asserted utility on its face. The PTO thus has not satisfied its initial burden. Accordingly, applicants should not have been required to substantiate their presumptively correct disclosure to avoid a rejection under the first paragraph of § 112. *See In re Marzocchi*, 439 F.2d at 224, 169 U.S.P.Q. (BNA) at 370.

We do not rest our decision there, however. Even if one skilled in the art [\*1567] would have reasonably questioned the asserted utility, i.e., even if the PTO met its initial burden thereby shifting the burden to the applicants to offer rebuttal evidence, applicants proffered sufficient evidence to convince one of skill in the art of the asserted utility. In particular, applicants provided through Dr. Kluge's declaration n19 test results showing that several compounds within the [\*\*19] scope of the claims exhibited significant antitumor activity against the L1210 standard tumor model *in vivo*. Such evidence alone should have been sufficient to satisfy applicants' burden.

n19 The declaration of Michael Kluge was signed and dated June 19, 1991. This declaration listed test results (i.e. antitumor activity) of the claimed compounds, *in vivo*, against L1210 tumor cells and concluded that these compounds would likely be clinically useful as anti-cancer agents. Enablement, or utility, is determined as of the application filing date. *In re Glass*, 492 F.2d 1228, 1232, 181 U.S.P.Q. (BNA) 31, 34 (CCPA 1974). The Kluge declaration, though dated after applicants' filing date, can be used to substantiate any doubts as to the asserted utility since this pertains to the accuracy of a statement already in the specification. *In re Marzocchi*, 439 F.2d at 224 n.4, 169 U.S.P.Q. (BNA) at 370 n.4. It does not render an insufficient disclosure enabling, but instead goes to prove that the disclosure was in fact enabling when filed (i.e., demonstrated utility).

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The prior art further supports the conclusion that one skilled in the art would be convinced of the applicants' asserted utility. As previously mentioned, prior art — Zee Cheng et al. and Paull — disclosed structurally similar compounds which were proven *in vivo* against various tumor models to be effective as chemotherapeutic agents. [HN6] Although it is true that minor changes in chemical compounds can radically alter their effects on the human body, *Kawai*, 480 F.2d at 891, 178 U.S.P.Q. (BNA) at 167, evidence of success in structurally similar compounds is relevant in determining whether one skilled in the art would believe an asserted utility. *See Rey-Bellet v. Engelhardt*, 493 F.2d 1380, 181 U.S.P.Q. (BNA) 453 (CCPA 1974); *Kawai*, 480 F.2d 880, 178 U.S.P.Q. (BNA) 158.

The Commissioner counters that such *in vivo* tests in animals are only preclinical tests to determine whether a compound is suitable for processing in the second stage of testing, by which he apparently means *in vivo* testing in humans, and therefore are not reasonably predictive of the success of the claimed compounds for treating cancer in humans. n20 The Commissioner, as did the Board, confuses [\*\*21] the requirements under the law for obtaining a patent with the requirements for obtaining government approval to market a particular drug for human consumption. *See Scott v. Finney*, 34 F.3d 1058, 1063, 32 U.S.P.Q.2D (BNA) 1115, 1120 (Fed. Cir. 1994) ("Testing for the full safety and effectiveness of a prosthetic device is more properly left to the Food and Drug Administration (FDA). Title 35 does not demand that such human testing occur within the confines of Patent and Trademark Office (PTO) proceedings.").

n20 We note that this discussion is relevant to the earlier discussion as well. If we were to conclude that these *in vivo* tests are insufficient to establish usefulness for the claimed compounds, that would bear on the issue of whether one skilled in the art would, in light of the structurally similar compounds in Paull and Zee Cheng et al., have cause to doubt applicants' asserted usefulness for the compounds.

Our court's predecessor has determined that [HN7] proof of an alleged pharmaceutical property [\*\*22] for a compound by statistically significant tests with standard experimental animals is sufficient to establish utility. *In re Krimmel*, 48 C.C.P.A. 1116, 292 F.2d 948, 953, 130 U.S.P.Q. (BNA) 215, 219 (CCPA 1961); *see also In re Bergel*, 48 C.C.P.A. 1101, 292 F.2d 958, 130 U.S.P.Q. (BNA) 205 (CCPA 1961). In concluding that similar *in vivo* tests were adequate proof of utility the court in *In re Krimmel* stated:

We hold as we do because it is our firm conviction that one who has taught the public that a compound exhibits some desirable pharmaceutical property in a standard experimental animal has made a significant and useful contribution to the art, even though it may eventually appear that the compound is without value in the treatment in humans.

*Krimmel*, 292 F.2d at 953, 130 U.S.P.Q. (BNA) at 219. Moreover, NCI apparently believes these tests are statistically significant because it has explicitly recognized both the P388 and L1210 murine tumor models as standard screening tests for determining whether new [\*1568] compounds may be useful as antitumor agents.

In the context of this case the Martin and Pazdur references, on which the Commissioner relies, do not convince us otherwise. Pazdur only questions [\*23] the reliability of the screening tests against lung cancer; it says nothing regarding other types of tumors. Although the Martin reference does note that some laboratory oncologists are skeptical about the predictive value of *in vivo* murine tumor models for human therapy, Martin recognizes that these tumor models continue to contribute to an increasing human cure rate. In fact, the authors conclude that this perception (i.e. lack of predictive reliability) is not tenable in light of present information.

On the basis of animal studies, and controlled testing in a limited number of humans (referred to as Phase I testing), the Food and Drug Administration may authorize Phase II clinical studies. See 21 U.S.C. § 355(i)(1); 5 C.F.R. § 312.23(a)(5), (a)(8) (1994). Authorization for a Phase II study means that the drug may be administered to a larger number of humans, but still under strictly supervised conditions. The purpose of the Phase II study is to determine primarily the safety of the drug when administered to a larger human population, as well as its potential efficacy under different dosage regimes. See 21 C.F.R. § 312.21(b).

[HN8] FDA approval, however, [\*24] is not a prerequisite for finding a compound useful within the meaning of the patent laws. *Scott*, 34 F.3d 1058, 1063, 32 U.S.P.Q.2D (BNA) 1115, 1120. [HN9] Usefulness in patent law, and in particular in the context of pharmaceutical inventions, necessarily includes the expectation of further research and development. The stage at which an invention in this field becomes useful is well before it is ready to be administered to humans. Were we to require Phase II testing in order to prove utility, the associated costs would prevent many companies from obtaining patent protection on promising new inventions, thereby eliminating an incentive to pursue, through research and

development, potential cures in many crucial areas such as the treatment of cancer.

In view of all the foregoing, we conclude that applicants' disclosure complies with the requirements of 35 U.S.C. § 112 P1.

3.

The Commissioner takes this opportunity to raise the question of this court's standard of review when deciding cases on appeal from the PTO. Traditionally we have [HN10] recited our standard of review to be, with regard to questions of law, that review is without deference to the views of the Agency, *In re Donaldson*, [\*25] 16 F.3d 1189, 1192, 29 U.S.P.Q.2D (BNA) 1845, 1848 (Fed. Cir. 1994) (in banc), *In re Caveney*, 761 F.2d 671, 674, 226 U.S.P.Q. (BNA) 1, 3 (Fed. Cir. 1985), and with regard to questions of fact, we defer to the Agency unless its findings are "clearly erroneous." See, e.g., *In re Baxter Travenol Labs*, 952 F.2d 388, 21 U.S.P.Q.2D (BNA) 1281 (Fed. Cir. 1991); *In re Woodruff*, 919 F.2d 1575, 16 U.S.P.Q.2D (BNA) 1934 (Fed. Cir. 1990); *In re De Blauwe*, 736 F.2d 699, 222 U.S.P.Q. (BNA) 191 (Fed. Cir. 1984).

[HN11] With regard to judgment calls, those questions that fall "somewhere near the middle of the fact-law spectrum," this court has recognized "the falseness of the fact-law dichotomy, since the determination at issue, involving as it does the application of a general legal standard to particular facts, is probably most realistically described as neither of fact nor law, but mixed." *Campbell v. Merit Systems Protection Board*, 27 F.3d 1560, 1565 (Fed. Cir. 1994). When these questions of judgment are before us, whether we defer, and the extent to which we defer, turns on the nature of the case and the nature of the judgment. *Id.* ("Characterization therefore must follow from an *a* [\*26] *priori* decision as to whether deferring . . . is sound judicial policy. We would be less than candid to suggest otherwise.").

The Commissioner contends that the appropriate standard of review for this court regarding questions of law, of fact, and mixed questions of law and fact, coming to us from the PTO is found in the Administrative Procedure Act (APA) at 5 U.S.C. § 706. The standard set out there is that "the reviewing court shall . . . hold unlawful and set aside agency action, findings, and conclusions found to be — (A) arbitrary, capricious, an [\*1569] abuse of discretion, or otherwise not in accordance with law; . . . (E) unsupported by substantial evidence . . . ." The Commissioner is of the view that the stated standard we now use, which is the traditional standard of review for matters coming from a trial court, is not appropriate for decisions coming from an agency with presumed exper-

tise in the subject area, and is not in accord with law.  
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n21 Congress enacted the Administrative Procedure Act (APA) on June 11, 1946. *See* 1 Kenneth Culp Davis, *Administrative Law Treatise*, § 1:7 (2d ed. 1978). The APA sets forth a framework for administrative agency procedure and provides judicial review for persons adversely affected by final agency actions. Chapter 7, codified at 5 U.S.C. § 701-706, contains the APA judicial review provisions, including the standard of review provision quoted above.

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Applicants argue that by custom and tradition, recognized by the law of this court, the standard of review we have applied, even though inconsistent with the standard set forth in the APA, nevertheless is a permissible standard. In our consideration of this issue, there is a reality check: would it matter to the outcome in a given case which formulation of the standard a court articulates in arriving at its decision? The answer no doubt must be that, even though in some cases it might not matter, in others it would, otherwise the lengthy debates about the meaning of these formulations and the circumstances in which they apply would be unnecessary.

A preliminary question, then, is whether this is one of those cases in which a difference in the standard of review would make a difference in the outcome. The ultimate issue is whether the Board correctly applied the § 112 P1 enablement mandate and its implicit requirement of practical utility, or perhaps more accurately the underlying requirement of § 101, to the facts of this case. As we have explained, the issue breaks down into two subsidiary issues: (1) whether a person of ordinary skill in the art would conclude that the applicants [\*\*28] had sufficiently described particular diseases addressed by the invention,

and (2) whether the Patent Act supports a requirement that makes human testing a prerequisite to patentability under the circumstances of this case.

The first subsidiary issue, whether the application adequately described particular diseases, calls for a judgment about what the various representations and discussions contained in the patent application's specification would say to a person of ordinary skill in the art. We have considered that question carefully, and, for the reasons we explained above in some detail, we conclude that the Board's judgment on this question was erroneous. Our conclusion rests on our understanding of what a person skilled in the art would gather from the various art cited, and from the statements in the application itself. We consider the Board's error to be sufficiently clear that it is reversible whether viewed as clear error or as resulting in an arbitrary and capricious decision.

The second subsidiary issue, whether human testing is a prerequisite to patentability, is a pure question of law: what does the practical utility requirement mean in a case of this kind. Under either [\*\*29] our traditional standard or under the APA standard no deference is owed the Agency on a question of law, and none was accorded.

If the question concerning the standard of review, raised by the Commissioner, is to be addressed meaningfully, it must arise in a case in which the decision will turn on that question, and, recognizing this, the parties fully brief the issue. This is not that case. We conclude that it is not necessary to the disposition of this case to address the question raised by the Commissioner; accordingly, we decline the invitation to do so.

### III. CONCLUSION

The Board erred in affirming the examiner's rejection under 35 U.S.C. § 112 P1. The decision is reversed.

**REVERSED**